REMARKS

The present application includes pending claims 20-53. Claims 20, 37, 48-51 and 53 have been amended, as set forth above to further clarify the language used in these claims and to further prosecution of the present application. Claims 1-19 are cancelled. The Applicant respectfully submits that the claims define patentable subject matter.

Claims 20-53 have been rejected under 35 U.S.C. § 101 for allegedly being directed to non-statutory subject matter.

Claims 20-53 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Martin et al. ("Unitary ESPRIT: How to Obtain Increased Estimation Accuracy with a Reduced Computational Burden", hereinafter Martin) in view of the admitted prior art (Brief Description of Related Art on page 1 of the present application).

The Applicant respectfully traverses these rejections at least for the reasons previously set forth during prosecution and at least based on the following remarks.

I.   Claim Rejections under 35 U.S.C. § 101

In pages 2-3 of the Final Office Action, the Examiner has rejected claims 20-53 for allegedly being directed to non-statutory subject matter. Specifically, the Examiner alleges that the claims disclose filtering parameters and a filtering process, that the filtering process can be mathematical filtering and the final result is just a parameter. The Applicant respectfully traverses this rejection. Nevertheless, in an effort to expedite prosecution, claims 20, 37, 48-51 and 53 have been amended, as set forth above. The Applicant has amended independent claim 20 and 37 to include the language "adaptively configuring one or more filters utilizing at least a portion of said set of complex number arithmetic adaptation parameters". The Applicant submits that the alleged final results in independent claims 20 and 37 are for adaptively configuring one or more filters, instead of a parameter, as alleged by the Examiner. The Applicant submits that claims 20-53 overcome the rejection under 35 U.S.C. § 101, and this rejection should now be withdrawn.

II.   REJECTION UNDER 35 U.S.C. § 103

In order for a *prima facie* case of obviousness to be established, the Manual of Patent Examining Procedure, Rev. 6, Sep. 2007 ("MPEP") states the following:

> The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have

been obvious. The Supreme Court in KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."

See the MPEP at § 2142, citing In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), and KSR International Co. v. Teleflex Inc., 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). Further, MPEP § 2143.01 states that "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art" (citing KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1396 (2007)). Additionally, if a prima facie case of obviousness is not established, the Applicant is under no obligation to submit evidence of nonobviousness:

> The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness.

See MPEP at § 2142.

A.   **The Proposed Combination of Martin and Admitted Prior Art Does Not Render Claims 20-53 Unpatentable**

The Applicant first turns to the rejection of claims 20-53 under 35 U.S.C. 103(a) as being unpatentable over Martin in view of the admitted prior art.

A(1). Rejection of Independent Claims 20 and 37 under 35 U.S.C. § 103 (a)

With regard to the rejection of independent claim 20 under 35 U.S.C. § 103(a), the Applicant submits that the combination of Martin and the admitted prior art does not disclose or suggest at least the limitation of "means for transforming adaptation observations **from a complex arithmetic** to **two sets of real number** arithmetic observations by means of binary orthogonalization transformation (BOT)," as recited by the Applicant in independent claim 20.

In the Office Action, the Examiner alleges Martin discloses the following:

> "means for transforming adaptation observations from a complex arithmetic to two sets of real number arithmetic observations by means of binary orthogonalization transformation (BOT) (e.g. page 1232 right column lines 3-17 which transforming/converting the complex matrices **into a set of real matrices**)"

See the Office Action at page 3 (with emphasis). The Examiner relies for support on Martin, page 1233, right column. Specifically, Martin states:

> ... by transforming the required rank-revealing factorizations of complex matrices into decompositions of **real-valued matrices of the same size**..."

See Martin at page 1232, right column, lines 6-7 (with emphasis). The Examiner seems to equate Martin's **real-valued matrices** to the Applicant's "**two sets of real number arithmetic observations**". Even though Martin discloses, at the above citation, that complex matrices may be converted to real matrices, Martin is still deficient and does not disclose the above claim limitation. For

example, Applicant's claim 20 discloses transforming "a complex arithmetic" (i.e., a single complex arithmetic) to two sets of real numbers. However, Martin, at the above citation, discloses transforming complex matrices to real matrices of the same size. Therefore, Martin does not disclose or suggest "means for transforming adaptation observations **from a complex arithmetic** to **two sets of real number** arithmetic observations by means of binary orthogonalization transformation (BOT)," as recited by the Applicant in independent claim 20. The admitted prior art does not overcome the above deficiencies of Martin.

In addition, with regard to the rejection of independent claim 20 under 35 U.S.C. § 103(a), the Applicant submits that the combination of Martin and the admitted prior art does not disclose or suggest at least the limitation of "means for computing **two sets of real number** arithmetic adaptation parameters **by applying two real number Least Square Solvers (LESS) to said two sets of real number** arithmetic observations," as recited by the Applicant in independent claim 20.

In the Office Action, the Examiner concedes the following:

"Martin et al. fail to explicitly spell-out the term LESS as a means for computing two sets of real number arithmetic adaptation parameters by applying two real number Least Square Solvers (LESS) to said two sets of real number arithmetic observations."

See the Office Action at page 4. The Examiner relies for support on the

Applicant's discussion of prior art in page 1 of the pending application and states

the following:

> "However, the admitted prior art discloses in page 1 a means for computing **two sets of real number** arithmetic adaptation parameters **by applying two real number Least Square Solvers (LESS) to said two sets of real number arithmetic observations** (e.g. last two paragraphs in page 1 wherein LESS is common and most widely used in solving such systems of linear equations)."

See the Office Action at page 4 (with emphasis). The Examiner seems to

have misinterpreted the prior art discussion. Specifically, the brief description of

related art on page 1 of the present application, discloses filtering adaptation

parameters are **complex-valued** (i.e., not real numbers), which are represented

by linear equation (1). Therefore, **the admitted prior art discloses that LESS is**

applied to systems with complex valued inputs, which are represented by

linear equation (i.e., "Xa = d"). In other words, the admitted prior art **does not**

disclose that LESS is applied to real-number arithmetic observations. In this

regard, the admitted prior art **does not** disclose "a means for computing **two sets**

of real number arithmetic adaptation parameters **by applying two real number**

Least Square Solvers (LESS) to said two sets of **real number** arithmetic

observations," as alleged by the Examiner.

Specifically, the Examiner is referred to Fig. 1 and the related description on

page 4 of the present application, where the prior art discloses that LESS in block

100 is used to solve **a complex-valued input** vector "x" of length M to produce **a complex valued output** vector "a" of length M. In other words, the admitted prior art discloses applying **an input with a complex valued** input vector, instead of "**two** sets of **real numbers**", as claimed by the Applicant in claim 20. Therefore, the Applicant maintains that the combination of Martin and the admitted prior art **does not** disclose or suggest at least the limitation of "means for computing **two sets of real number** arithmetic adaptation parameters **by applying two real number Least Square Solvers (LESS) to said two sets of real number** arithmetic observations," as recited by the Applicant in independent claim 20.

Moreover, with regard to the rejection of independent claim 20 under 35 U.S.C. § 103(a), the Applicant submits that the combination of Martin and the admitted prior art does not disclose or suggest at least the limitation of "means for **transforming,** after said computing with LESS, said **two sets of real adaptation parameters to a set of complex number** arithmetic adaptation parameters **using an inverse binary orthogonalization transform** (IBOT)," as recited by the Applicant in independent claim 20.

In the Office Action, the Examiner alleges that Martin discloses the following:

> "means for transforming said two sets of real adaptation parameters to a set of complex number arithmetic adaptation parameters using an inverse binary orthogonalization transform (IBOT) (e.g. **as reversed processed of BOT** above, page 1232

right column lines of first paragraph, and right column lines 8-10
page 1232),"

See the Office Action at pages 3-4 (with emphasis). The Examiner relies

for support to Martin, specifically, Martin states:

"...This reduction can be achieved by constructing **invertible
transformations** that map **centro-Hermitian matrices to real
matrices**"

See Martin at page 1232, right column lines 8-10. The Examiner seems to

equate "**invertible transformations** that map **centro-Hermitian matrices...**" the

same as "**transforming...using an inverse binary orthogonalization transform**

(IBOT)," as recited by the Applicant in independent claim 20. The Applicant

respectfully disagrees and points out that Martin, in the above citation, clearly

discloses that the invertible transformation maps **centro-Hermitian matrices to**

real matrices, not into complex number parameters. In other words, Martin, on

the contrary, discloses that the invertible transformation is to map the complex

variables into real matrices using the centro-Hermitian transformation, i.e., the

binary orthogonalization transform (BOT), contrary to the **inverse binary**

orthogonalization transform (IBOT), as alleged by the Examiner.

Moreover, the Applicant points out that Martin's inverting transformation that

maps **centro-Hermitian matrices** (i.e., complex variables) to real matrices, in fact

teaches away from the Applicant's from real numbers (i.e. two sets of real

adaptation parameters) to a set of complex number arithmetic adaptation

parameters. Therefore, based on at least the foregoing rationale, the Applicant

maintains that Martin does not disclose or suggest "**transforming,** after said computing with LESS, said **two sets of real adaptation parameters to a set of complex number** arithmetic adaptation parameters **using an inverse binary orthogonalization transform** (IBOT)," as recited by the Applicant in independent claim 20.

Furthermore, the Applicant points out that Martin does not disclose or suggest that the disclosed means are for "adaptively configuring one or more filters utilizing at least a portion of said set of complex number arithmetic adaptation parameters," as recited by the Applicant in claim 20.

In the Office Action, the Examiner alleges Martin discloses the following:

> "Re claim 20, Martin et al. disclose in the article a system for processing signals (e.g. abstract in page 1232 and conclusion remark in page 1241 **by filtering/reconstructing the original waveform/signal)**"

See the Office Action at page 3 (with emphasis). The Examiner relies for support on Martin's Abstract, which states the following:

> "ESPRIT is **a high-resolution signal parameter estimation technique** based on the translational invariance structure **of a sensor array** … to constrain the estimated phase factors to the unit circle, … resulting closed form algorithm … Unitary ESPRIT offers an inexpensive possibility to **reconstruct the impinging wavefronts signal copy**"

See Martin at the Abstract, lines 1-18. The Examiner seems to equate reconstruction of the impinging wavefronts signal copy from the sensor array to adaptive filtering configuration. The Applicant respectfully disagrees. Martin, in

the above citation, discloses that the Unitary ESPRIT closed-form algorithm is unique for unit circle, for solving phase factors (i.e. phase delays caused by direction of arrival or incidence angles) relative to the (plurality of spaced apart) phase sensors on a planar array (i.e., a phased array antenna panel), which is described in Martin's Fig. 1 on page 1234. In other words, Martin's reconstruction of the wave fronts is to reconstruct the differing phase delays relative to the (plurality of spaced apart) sensors on the phase array antenna. Therefore, the Applicant maintains that there is no disclosure or suggestion in Martin's Abstract, or anywhere else in Martin, that the Unitary ESPRIT closed-form algorithm is for "adaptively configuring the filters," as recited by the Applicant in claim 20. In addition, the admitted prior art does not overcome the above deficiency of Martin.

Accordingly, based on the foregoing rationale, the Applicant maintains that the combination of Martin and the admitted prior art does not establish a *prima facie* case of obviousness to reject claim 20. The Applicant respectfully requests that the rejection to claim 20 under 35 U.S.C. § 103(a) be withdrawn, and independent claim 20 should be allowable.

Likewise, independent claim 37 is similar in many respect to independent claim 20, is also submitted to be allowable. The Applicant also reserves the right to argue additional reasons beyond those set forth above to support the allowability of claims 20 and 37.

A(2). Rejection of Dependent Claims 21-36 and 38-53

Based on at least the foregoing, the Applicant believes the rejection of independent claims 20 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of the admitted prior art has been overcome and requests that the rejection be withdrawn. Additionally, claims 21-36 and 38-53 depend directly or indirectly from respective independent claims 20 and 37, are, consequently, also respectfully submitted to be allowable.

In addition, with regard to the rejection of claims 21 and 38, the Examiner takes an Office Notice to allege that operating an algorithm in parallel manner (i.e., two real numbers applied to LESS in parallel manner) is well-known in the art, and widely used in many practical application in the technology. The Applicant submits that claim 21 is allowable based on the following argument.

A(2.1) Traversal Of Official Notice to Claims 21 and 38

With regard to the rejection of claims 21 and 38 by the Examiner's Official Notice In page 5 of the Office Action, the Applicant disputes the Examiner's assertions that operating two real numbers applied to LESS in parallel manner is well-known in the art, and widely used in many practical application in the technology (page 5 of the Office Action). Because the combination of Martin and the admitted prior art clearly does not disclose or suggest applying two real numbers to LESS in parallel manner, the Applicant can only assume that the

Office Action is taking Official Notice of the subject matter disclosed in claim 21 and 38 regarding applying two real numbers to LESS in parallel manner, as in the Applicant's invention.

Additionally, the Applicant disputes the Examiner's assertions that after transforming complex variables using BOT, applying two real numbers to LESS in parallel manner is old and a well-known practice, and that it would have been obvious to a person skilled in the art at the time the invention was made to apply two real numbers to LESS in parallel manner in Martin (page 5 of the Office Action). Because the admitted prior art clearly does not disclose or suggest applying two real numbers to LESS in parallel manner, the Applicant can only assume that the Office Action is taking Official Notice of the subject matter disclosed in claims 28 and 38 regarding applying two real numbers to LESS in parallel manner in the Applicant's invention.

Assuming the Office Action is asserting Official Notice that the subject of the above listed statements is common knowledge, the Applicant respectfully traverses the perceived and explicit assertions as further set forth below. Alternatively, if the Office Action's assertions are based on the personal knowledge of the Examiner, then under MPEP § 2144.03(C) and 37 C.F.R. § 1.104(d)(2), the assertions must be supported by an affidavit from the Examiner.

According to MPEP § 2144.03(A), Official Notice, without supporting references, should only be asserted when the subjects asserted to be common knowledge are "capable of instant and unquestionable demonstration as being well-known." That is, the subjects asserted must be of "notorious character" under MPEP § 2144.03(A).

However, the Applicant respectfully submits that the subject matter of the perceived and explicit assertions of Official Notice, as stated in page 5 of the Office Action, are not well-known in the art as evidenced by the searched and cited prior art. The Applicant respectfully submits that the Examiner has performed "a thorough search of the prior art," as part of the Examiner's obligation in examining the present application under MPEP § 904.02.

Additionally, the Applicant respectfully submits that the Examiner's searched and cited references found during the Examiner's thorough and detailed search of the prior art are indicative of the knowledge commonly held in the art. However, in the Examiner's thorough and detailed search of the relevant prior art, none of the prior art taught or suggested the subject matter of the perceived and explicit assertions of Official Notice with regards to claims 21 and 38, as stated in page 5 of the Office Action. That is, the Examiner's thorough and detailed search of the prior art has failed to yield any mention of the limitations in claims 21 and 38, which the Office Action concedes are not explicitly found in the combination of Martin and the admitted prior art, and which the Examiner asserts are widely

known in the art. The Applicant respectfully submits that if the subject matter of these assertions of Official Notice had been of "notorious character" and "capable of instant and unquestionable demonstration as being well-known" under MPEP § 2144.03(A), then the subject matter would have appeared to the Examiner during the Examiner's thorough and detailed search of the prior art.

If the Examiner had found any teaching of relevant subject matter, the Examiner would have been obligated to list the references teaching the relevant subject matter and make a rejection. Consequently, the Applicant respectfully submits that the prior art does not teach the subject matter of the perceived assertions of Official Notice stated in page 5 of the Office Action and respectfully traverses the perceived assertions of Official Notice.

The Applicant specifically challenges the perceived and explicit assertions of Official Notice with regard to claims 21 and 38. As stated above, the Applicant respectfully traverses the perceived and explicit assertions of Official Notice and submits that the subject matter of claims 21 and 38 is not of such "notorious character" that it is "capable of instant and unquestionable demonstration as being well-known." Under MPEP 2144.03, the Examiner is now obligated to provide a reference(s) in support of the perceived assertions of Official Notice if the Examiner intends to maintain any rejection based thereon. Additionally, the Applicant respectfully requests the Examiner reconsider the assertion of Official Notice and provide any basis for the assertions of Official Notice.

A(2.2) **Rejection to Claims 22, 31-36, 39 and 48-53**

With regard to the rejection of claims 22 and 39, the Examiner has cited the admitted prior art in Fig. 1, where the LESS block 100 is applied in series, alleging that the LESS block 100 also discloses the Applicant's claimed "two real number LESS are applied in series". The Applicant points out that the LESS block 100 discloses a single input of complex-valued vector input in series, not "two real number applied in series". Therefore claims 22 and 39 are submitted to be allowable.

In addition, with regard to the rejection of claims 31 and 48, the Examiner is referred to the similar argument in claim 20, that the combination of Martin and the admitted prior art does not disclose applying two real numbers to LESS (likewise to also CLESS). Therefore claims 31 and 48 are submitted to be allowable.

In addition, with regard to the rejection of claims 32-36 and 49-53, the Examiner seems to rely on pages 2-3 of the pending application, to mistakenly regard the invention to be admitted prior art. Therefore claims 32-36 and 49-53 are submitted to be allowable.

Furthermore, the Applicant also reserves the right to argue additional reasons beyond those set forth above to support the allowability of claims 21-36 and 38-53.

CONCLUSION

Based on at least the foregoing, the Applicant believes that all claims 20-53 are in condition for allowance. If the Examiner disagrees, the Applicant respectfully requests a telephone interview, and request that the Examiner telephone the undersigned Patent Agent at (312) 775-8093.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to the deposit account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

A Notice of Allowability is courteously solicited.

Respectfully submitted,

Date: August 07, 2008

/ Frankie W. Wong/

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